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EXAMINER

ZERVIGON, RUDY

ART UNIT PAPER NUMBER

1763

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/782,727	LINDFORS ET AL.	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 01 January 1943.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-43 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input checked="" type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. <u>20051205</u> . |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>All</u> . | 6) <input type="checkbox"/> Other: _____. |

DETAILED ACTION

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “gas outlet”, “first apertures”, “first passages”, “second passages”, “second apertures”, “third apertures”, “first distributor passages”, “grooves”, “recess”, “wafer handler”, “first and second holes”, “first flow path”, “second flow path”, “first bore”, “second bore”, “grooves” must be shown or the features canceled from the claims. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 10 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claims, or amend the claims to place the claims in proper dependent form, or rewrite the claims in independent form. Claim 10 depends from itself.

Double Patenting

3. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the “right to exclude” granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-43 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-43 of copending Application No. 10/428,207.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of 10/428,207 do not require an integral “plate”, whereas the claims of the present invention are directed to a plate. It would have been obvious to one of ordinary skill in the art at the time the invention was made to make the gas conduits of 10/428,207 integral.

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Further, it is established that the use of a one piece construction instead of interconnected components is obvious (In re Larson, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965), MPEP 2144.04).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 1-43 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The specification as filed is devoid of any references to “gas outlet”, “first apertures”, “first passages”, “second passages”, “second apertures”, “third apertures”, “first distributor passages”, “grooves”, “recess”, “wafer handler”, “first and second holes”, “first flow path”, “second flow path”, “first bore”, and “second bore”.

7. Claim 6 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 6 requires “having a first side and a second side flush with the first side of the

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gas exchange plate". It is uncertain which side is flush with the first side of the gas exchange plate. The first side and a second side, or only the second side?

8. Claim 7 recites the limitation "third plurality of apertures". There is insufficient antecedent basis for this limitation in the claim.

9. Claim 16 recites the limitation "the plate". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

10. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

11. Claims 1-9, 11, 13, 16, 18, 20, 21, 30-32, 34-36, and 39-42 are rejected under 35 U.S.C. 102(b) as being anticipated by Heming; Martin et al. (US 6025013 A). Heming teaches an apparatus (Figure 1; column 11; lines 10-30) for depositing a thin film on a substrate (1; Figure 1; column 11; lines 10-30), comprising: a reaction chamber (4; Figure 1; column 11; lines 10-30) having a reaction space (between 2 and 11; Figure 1; column 11; lines 10-30); a substrate holder (5; Figure 1; column 11; lines 10-30) for holding the substrate (1; Figure 1; column 11; lines 10-30) within the reaction space (between 2 and 11; Figure 1; column 11; lines 10-30); a gas outlet (13-15; Figure 1; column 11; lines 10-30) in fluid communication with the reaction space (between 2 and 11; Figure 1; column 11; lines 10-30); a gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30) having a first side (12; Figure 1; column 11; lines 10-30) and a second side (top of 15; Figure 1; column 11; lines 10-30), positioned within the reaction chamber

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(4; Figure 1; column 11; lines 10-30), the plate comprising: a plurality of first passages (bifurcated 21 within 10; Figure 1; column 11; lines 10-30) machined therein being in fluid communication with a first reactant gas source (28; Figure 1; column 11; lines 10-30) and a purge gas source (27; Figure 1; column 11; lines 10-30), the first passages (bifurcated 21 within 10; Figure 1; column 11; lines 10-30) communicating with a plurality of first apertures (14; Figure 1; column 11; lines 10-30) spaced along the first passages (bifurcated 21 within 10; Figure 1; column 11; lines 10-30), the first apertures (14; Figure 1; column 11; lines 10-30) opening to the reaction space (between 2 and 11; Figure 1; column 11; lines 10-30); a plurality of second passages (bifurcated 22 within 10; Figure 1; column 11; lines 10-30) machined therein being in fluid communication with a second reactant gas source (28; Figure 1; column 11; lines 10-30) and a purge gas source (27; Figure 1; column 11; lines 10-30), the second passages (bifurcated 22 within 10; Figure 1; column 11; lines 10-30) communicating with a plurality of second apertures (15; Figure 1; column 11; lines 10-30) spaced along the second passages (bifurcated 22 within 10; Figure 1; column 11; lines 10-30), the second apertures (15; Figure 1; column 11; lines 10-30) opening to the reaction space (between 2 and 11; Figure 1; column 11; lines 10-30); and a plurality of third apertures (16; Figure 1; column 11; lines 10-30) extending from the first side (12; Figure 1; column 11; lines 10-30) to the second side (top of 15; Figure 1; column 11; lines 10-30) of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), allowing gas to pass therethrough, as claimed by claim 1

Heming further teaches:

- i. The apparatus (Figure 1; column 11; lines 10-30) of claim 1, wherein: the first passages (bifurcated 21 within 10; Figure 1; column 11; lines 10-30) include a first main passage

(streight portion of 21 within 10; Figure 1; column 11; lines 10-30) connected to a plurality of first distributor passages (14; Figure 1; column 11; lines 10-30); and the second passages (bifurcated 22 within 10; Figure 1; column 11; lines 10-30) include a second main passage (streight portion of 22 within 10; Figure 1; column 11; lines 10-30) connected to a plurality of second distributor passages (15; Figure 1; column 11; lines 10-30), as claimed by claim 2

- ii. The apparatus (Figure 1; column 11; lines 10-30) of claim 2, wherein the first main passage (streight portion of 21 within 10; Figure 1; column 11; lines 10-30) is formed along a first side (12; Figure 1; column 11; lines 10-30) of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30) and the second main passage (streight portion of 22 within 10; Figure 1; column 11; lines 10-30) extends parallel to the first main passage (streight portion of 21 within 10; Figure 1; column 11; lines 10-30) along an opposite side of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), as claimed by claim 3
- iii. The apparatus (Figure 1; column 11; lines 10-30) of claim 3, wherein the first distributor passages (14; Figure 1; column 11; lines 10-30) extend parallel to the second distributor passages (15; Figure 1; column 11; lines 10-30) and extend perpendicularly from the first and second main passages (streight portion of 21, 22 within 10; Figure 1; column 11; lines 10-30), respectively, as claimed by claim 4
- iv. The apparatus (Figure 1; column 11; lines 10-30) of claim 4, wherein the first distributor passages (14; Figure 1; column 11; lines 10-30) alternate with the second distributor passages (15; Figure 1; column 11; lines 10-30) along an axis parallel to the first and

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- second main passages (streight portion of 22, 23 within 10; Figure 1; column 11; lines 10-30), as claimed by claim 5
- v. The apparatus (Figure 1; column 11; lines 10-30) of claim 1, further comprising an exhaust plate (10; Figure 1; column 11; lines 10-30) having a first side (12; Figure 1; column 11; lines 10-30) and a second side (top of 15; Figure 1; column 11; lines 10-30) flush with the first side (12; Figure 1; column 11; lines 10-30) of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), as claimed by claim 6
- vi. The apparatus (Figure 1; column 11; lines 10-30) of claim 6, wherein the gas exhaust plate (10; Figure 1; column 11; lines 10-30) includes a plurality of exhaust apertures (16; Figure 1; column 11; lines 10-30) aligned with the third plurality (13; Figure 1) of apertures of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), as claimed by claim 7
- vii. The apparatus (Figure 1; column 11; lines 10-30) of claim 7, wherein the first and second passages (bifurcated 22, 21 within 10; Figure 1; column 11; lines 10-30) comprise grooves (passages 14, 15) on the first side (12; Figure 1; column 11; lines 10-30) of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), the exhaust plate (10; Figure 1; column 11; lines 10-30) overlying and sealing the grooves (passages 14, 15) to enclose the first and second passages (bifurcated 22 within 10; Figure 1; column 11; lines 10-30), as claimed by claim 8
- viii. The apparatus (Figure 1; column 11; lines 10-30) of claim 7, wherein the exhaust plate (10; Figure 1; column 11; lines 10-30) includes a recess (16; Figure 1; column 11; lines 10-30) defined in the first side (12; Figure 1; column 11; lines 10-30) of the exhaust plate

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- (10; Figure 1; column 11; lines 10-30) and an exhaust conduit (17; Figure 1; column 11; lines 10-30) communicating from the recess (16; Figure 1; column 11; lines 10-30) to an edge of the exhaust plate (10; Figure 1; column 11; lines 10-30), as claimed by claim 9
- ix. The apparatus (Figure 1; column 11; lines 10-30) of claim 1, wherein the first (14), second (16) and third apertures (16; Figure 1; column 11; lines 10-30) are interspersed with one another and substantially uniformly distributed across the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30) to provide gas flow substantially uniformly across the substrate holder (5; Figure 1; column 11; lines 10-30), as claimed by claim 11. When the structure recited in the reference is substantially identical to that of the claims, claimed properties or functions are presumed to be inherent (In re Best, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977); MPEP 2112.01).
- x. The apparatus (Figure 1; column 11; lines 10-30) of claim 1, wherein the substrate holder (5; Figure 1; column 11; lines 10-30) is an end effector of a wafer handler (42; Figure 2; column 12; lines 1-5), as claimed by claim 13
- xi. The apparatus (Figure 1; column 11; lines 10-30) of claim 1, wherein the plate (structure 11-15; Figure 1; column 11; lines 10-30) is positioned below the substrate holder (5; Figure 1; column 11; lines 10-30), as claimed by claim 16
- xii. The apparatus (Figure 1; column 11; lines 10-30) in claim 1, wherein the gas outlet (13-15; Figure 1; column 11; lines 10-30) is fluidly connected to a vacuum, as claimed by claim 18
- xiii. The apparatus (Figure 1; column 11; lines 10-30) of claim 1, further comprising controls (18, 19, 23-26; Figure 1; column 11; lines 10-30) for alternately providing first reactant to

the first plurality of passages while stopping second reactant flow to the second plurality of passages and providing second reactant to the second plurality of passages while stopping first reactant flow to the first plurality of passages, as claimed by claim 20. Applicant's claim limitation of "for alternately providing first reactant to the first plurality of passages while stopping second reactant flow to the second plurality of passages and providing second reactant to the second plurality of passages while stopping first reactant flow to the first plurality of passages" are claim requirements of intended use. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

- xiv. The apparatus (Figure 1; column 11; lines 10-30) of claim 1, wherein the first (14) and second (15) plurality of passages comprise open grooves (oulets) on the first side (12; Figure 1; column 11; lines 10-30) of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), as claimed by claim 21
- xv. The showerhead assembly (10-12; Figure 1; column 11; lines 10-30) of claim 28, wherein the exhaust plate (10; Figure 1; column 11; lines 10-30) has a first side (12; Figure 1; column 11; lines 10-30) and a second side (top of 15; Figure 1; column 11; lines 10-30),

the second side (top of 15; Figure 1; column 11; lines 10-30) of the exhaust plate (10; Figure 1; column 11; lines 10-30) configured to seal the surface grooves (passages 14, 15) of the first (21) and second (22) network of passages of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30) when the second side (top of 15; Figure 1; column 11; lines 10-30) of the exhaust plate (10; Figure 1; column 11; lines 10-30) is mated with the first side (12; Figure 1; column 11; lines 10-30) of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), as claimed by claim 30

- xvi. The showerhead assembly (10-12; Figure 1; column 11; lines 10-30) of claim 30, wherein the exhaust plate (10; Figure 1; column 11; lines 10-30) further comprises a recess (16; Figure 1; column 11; lines 10-30) formed in the first side (12; Figure 1; column 11; lines 10-30) of the exhaust plate (10; Figure 1; column 11; lines 10-30), the recess (16; Figure 1; column 11; lines 10-30) being in communication with each of the exhaust apertures (16; Figure 1; column 11; lines 10-30) at a bottom of the recess (16; Figure 1; column 11; lines 10-30), as claimed by claim 31
- xvii. The showerhead assembly (10-12; Figure 1; column 11; lines 10-30) of claim 31, wherein the exhaust plate (10; Figure 1; column 11; lines 10-30) further comprises outlet conduits (17) extending in fluid communication between the recess (16; Figure 1; column 11; lines 10-30) and an edge of the exhaust plate (10; Figure 1; column 11; lines 10-30), as claimed by claim 32
- xviii. A showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30) having a first side (12; Figure 1; column 11; lines 10-30) and a second side (top of 15; Figure 1; column 11; lines 10-30), comprising: a first flow path (21; Figure 1; column 11; lines 10-30) through

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the showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30), the first flow path (21; Figure 1; column 11; lines 10-30) including a plurality of first apertures (14; Figure 1; column 11; lines 10-30) opening to the second side (top of 15; Figure 1; column 11; lines 10-30) of the showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30); a second flow path (22; Figure 1; column 11; lines 10-30) through the showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30), the second flow path (22; Figure 1; column 11; lines 10-30) isolated from the first flow path (21; Figure 1; column 11; lines 10-30) within the plate (structure 11-15; Figure 1; column 11; lines 10-30), the second flow path (22; Figure 1; column 11; lines 10-30) including a plurality of second apertures (15; Figure 1; column 11; lines 10-30) opening to the second side (top of 15; Figure 1; column 11; lines 10-30) of the showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30); and a plurality of third apertures (16; Figure 1; column 11; lines 10-30) extending through the showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30), the third apertures (16; Figure 1; column 11; lines 10-30) isolated from the first and second flow paths (21, 22; Figure 1; column 11; lines 10-30) within the showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30), as claimed by claim 34

- xix. The showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30) of claim 34, wherein the first (14) and second (15) apertures are interspersed and distributed across the second side (top of 15; Figure 1; column 11; lines 10-30) of the showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30), as claimed by claim 35

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- xx. The showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30) of claim 35, wherein the first and second flow paths (21, 22; Figure 1; column 11; lines 10-30) each include a main passage (vertical entry portions 21, 22 inside 10; Figure 1; column 11; lines 10-30) and a plurality of distributor passages (horizontal entry portions 21, 22 inside 10; Figure 1; column 11; lines 10-30) branching from the main passage (vertical entry portions 21, 22 inside 10; Figure 1; column 11; lines 10-30), as claimed by claim 36
- xxi. The showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30) of claim 37, wherein the first flow path (21; Figure 1; column 11; lines 10-30) includes a first main passage (streight portion of 21 within 10; Figure 1; column 11; lines 10-30) and a plurality of branching first distributor passages (14; Figure 1; column 11; lines 10-30) and the second flow path (22; Figure 1; column 11; lines 10-30) includes a second main passage (streight portion of 22 within 10; Figure 1; column 11; lines 10-30) and a plurality of branching second distributor passages (15; Figure 1; column 11; lines 10-30), as claimed by claim 39
- xxii. The showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30) of claim 39, further comprising a first bore (14; Figure 1; column 11; lines 10-30) extending from an edge of the plate (structure 11-15; Figure 1; column 11; lines 10-30) into fluid communication with the first main passage (streight portion of 21 within 10; Figure 1; column 11; lines 10-30) and a second bore (15; Figure 1; column 11; lines 10-30) extending from an edge of the plate (structure 11-15; Figure 1; column 11; lines 10-30) into fluid communication with the second main passage (streight portion of 22 within 10; Figure 1; column 11; lines 10-30), as claimed by claim 40

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- xxiii. The showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30) of claim 39, wherein the first and second main passages (straight portion of 21, 22 within 10; Figure 1; column 11; lines 10-30) extend parallel to one another proximate opposite ends of the plate (structure 11-15; Figure 1; column 11; lines 10-30), as claimed by claim 41
- xxiv. The showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30) of claim 41, wherein the first (horizontal portion of 14) and second (horizontal portion of 15) distributor passages extend parallel to one another and perpendicular to the first and second main passages (straight portion of 21, 22 within 10; Figure 1; column 11; lines 10-30), the first (horizontal portion of 14) and second (horizontal portion of 15) distributor passages alternating with one another along an axis of the main passages (vertical entry portions 21, 22 inside 10; Figure 1; column 11; lines 10-30), as claimed by claim 42

Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 10, 12, 22-29, 33, 37, 38, and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heming; Martin et al. (US 6025013 A) in view of Oda; Masao et al. (US 5010842 A). Heming is discussed above. Heming further teaches the showerhead assembly (10-12; Figure 1; column 11; lines 10-30) of claim 27, wherein the first and second networks of

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passages (21, 22) comprise grooves (passages 14, 15) formed in the first side (12; Figure 1; column 11; lines 10-30) of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), as claimed by claim 28.

Heming does not teach:

- i. The apparatus (Figure 1; column 11; lines 10-30) of claim 10, further comprising a top plate having a first side and a second side, the second side of the top plate fitting with and sealing against the first side (12; Figure 1; column 11; lines 10-30) of the exhaust plate (10; Figure 1; column 11; lines 10-30), thereby sealing and defining an exhaust space within the recess (16; Figure 1; column 11; lines 10-30) of the exhaust plate (10; Figure 1; column 11; lines 10-30), as claimed by claim 10
- ii. The apparatus (Figure 1; column 11; lines 10-30) of claim 1, wherein the first plurality of apertures (14; Figure 1; column 11; lines 10-30) are distributed along a plurality of parallel lines and the second plurality of apertures (15; Figure 1; column 11; lines 10-30) (16) are distributed across a plurality of parallel lines alternated with the parallel lines of the first plurality of apertures (14; Figure 1; column 11; lines 10-30), as claimed by claim 12
- iii. The apparatus (Figure 1; column 11; lines 10-30) of claim 21, wherein the grooves (passages 14, 15) comprise rounded bottoms, as claimed by claim 22
- iv. The apparatus (Figure 1; column 11; lines 10-30) of claim 21, further comprising first and second holes through an edge of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), the first and second holes communicating with the grooves

(passages 14, 15) of the first and second passages (bifurcated 21, 22 within 10; Figure 1; column 11; lines 10-30), respectively, as claimed by claim 23

- v. The apparatus (Figure 1; column 11; lines 10-30) of claim 1, wherein the first (14) and second (15) apertures (Figure 1; column 11; lines 10-30) further comprise countersinks widening the first (14) and second (15) apertures (Figure 1; column 11; lines 10-30) at the second side (top of 15; Figure 1; column 11; lines 10-30) of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), as claimed by claim 24
- vi. The apparatus (Figure 1; column 11; lines 10-30) of claim 24, further comprising countersinks widening the third apertures (16; Figure 1; column 11; lines 10-30) at the second side (top of 15; Figure 1; column 11; lines 10-30) of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), as claimed by claim 25
- vii. An apparatus (Figure 1; column 11; lines 10-30) for depositing a thin film on a substrate (1; Figure 1; column 11; lines 10-30), comprising: a reaction chamber (4; Figure 1; column 11; lines 10-30) (4; Figure 1; column 11; lines 10-30) having a reaction space (between 2 and 11; Figure 1; column 11; lines 10-30); a substrate support (5; Figure 1; column 11; lines 10-30), disposed within the reaction space (between 2 and 11; Figure 1; column 11; lines 10-30); a first plate (structure 11-15; Figure 1; column 11; lines 10-30) positioned above the substrate support (5; Figure 1; column 11; lines 10-30), the first plate (structure 11-15; Figure 1; column 11; lines 10-30) having: a first gas inlet (21; Figure 1; column 11; lines 10-30) fluidly connected to a first plurality of apertures (14; Figure 1; column 11; lines 10-30) via a first gas pathway (portion 21 inside 10-12; Figure 1; column 11; lines 10-30); a second gas inlet (22; Figure 1; column 11; lines 10-30)

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fluidly connected to a second plurality of apertures (15; Figure 1; column 11; lines 10-30) via a second gas pathway (portion 22 inside 10-12; Figure 1; column 11; lines 10-30) , wherein the first and second pathways are machined into the first plate (structure 11-15; Figure 1; column 11; lines 10-30); a third apertures (13; Figure 1; column 11; lines 10-30) allowing gas to pass through the first plate (structure 11-15; Figure 1; column 11; lines 10-30); and a second plate (10; Figure 1; column 11; lines 10-30) fixed to a gas outlet (16; Figure 1; column 11; lines 10-30), positioned above the first plate (structure 11-15; Figure 1; column 11; lines 10-30), having a plurality of apertures allowing gas existing between the first plate (structure 11-15; Figure 1; column 11; lines 10-30) and the second plate (10; Figure 1; column 11; lines 10-30) to flow to the gas outlet (16; Figure 1; column 11; lines 10-30) - claim 26

- viii. A showerhead assembly (10-12; Figure 1; column 11; lines 10-30) for a vapor deposition chamber (4; Figure 1; column 11; lines 10-30), comprising: a gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30) having a thickness between a first side (12; Figure 1; column 11; lines 10-30) and a second side (top of 15; Figure 1; column 11; lines 10-30), the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30) defining a first network of passages (14; Figure 1; column 11; lines 10-30) in fluid communication with a first gas inlet (21; Figure 1; column 11; lines 10-30) and a second network of passages (15; Figure 1; column 11; lines 10-30) in fluid communication with a second gas inlet (22; Figure 1; column 11; lines 10-30) , the first and second network of passages including a plurality of first (14) and second (15) apertures opening from the first (21) and second (22) network of passages, respectively,

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to the second side (top of 15; Figure 1; column 11; lines 10-30) of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), the first (14) and second (15) apertures being interspersed and spaced across the second side (top of 15; Figure 1; column 11; lines 10-30) of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30), the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30) further including third apertures (16; Figure 1; column 11; lines 10-30) extending from the first side (12; Figure 1; column 11; lines 10-30) to the second side (top of 15; Figure 1; column 11; lines 10-30) through the thickness of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30) and being isolated from the first (21) and second (22) network of passages; and an exhaust plate (10; Figure 1; column 11; lines 10-30) having a plurality of exhaust apertures (16; Figure 1; column 11; lines 10-30) therein, the exhaust plate (10; Figure 1; column 11; lines 10-30) configured to mate with the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30) and align the exhaust apertures (16; Figure 1; column 11; lines 10-30) with the third apertures (16; Figure 1; column 11; lines 10-30) of the exhaust plate (10; Figure 1; column 11; lines 10-30) - claim 27

- ix. The showerhead assembly (10-12; Figure 1; column 11; lines 10-30) of claim 28, wherein the first and second gas inlets (21, 22; Figure 1; column 11; lines 10-30) comprise holes machined into an edge of the gas exchange plate (structure 11-15; Figure 1; column 11; lines 10-30) and in fluid communication with the first (21) and second (22) network of passages, respectively, as claimed by claim 29

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- x. The showerhead assembly (10-12; Figure 1; column 11; lines 10-30) of claim 32, further comprising a top plate having a thickness between a first side (12; Figure 1; column 11; lines 10-30) and a second side (top of 15; Figure 1; column 11; lines 10-30), the second side (top of 15; Figure 1; column 11; lines 10-30) of the top plate configured to mate with and seal against the first side (12; Figure 1; column 11; lines 10-30) of the exhaust plate (10; Figure 1; column 11; lines 10-30), thereby forming an exhaust space within the recess (16; Figure 1; column 11; lines 10-30) of the exhaust plate (10; Figure 1; column 11; lines 10-30), as claimed by claim 33
- xi. The showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30) of claim 35, wherein the first and second flow paths (21, 22; Figure 1; column 11; lines 10-30) each include a plurality of connected surface grooves, as claimed by claim 37
- xii. The showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30) of claim 37, wherein each of the surface grooves includes a rounded groove bottom, as claimed by claim 38
- xiii. The showerhead plate (structure 11-15; Figure 1; column 11; lines 10-30) of claim 34, wherein each of the apertures includes a countersink, as claimed by claim 43

Oda teaches an apparatus (Figure 4,9) comprising a top plate (15; Figure 4) and a gas exchange plate (40; Figure 4, 9). Oda further teaches his gas exchange plate with rounded bottom grooves / countersinks (bottom portion of 16; Figure 4).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Oda's top plate and add additional holes / apertures to Heming's showerhead assembly.

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Motivation to add Oda's top plate and add additional holes / apertures to Heming's showerhead assembly is for gas "uniformizing" as taught by Oda (column 3, line 13; column 1; lines 65-68). Further, it is well established that the duplication of parts is obvious (*In re Harza*, 274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04).

14. Claims 14, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heming; Martin et al. (US 6025013 A) in view of Kobayashi; Norio (US 5370709 A). Heming is discusses above. Heming does not teach:

- i. The apparatus (Figure 1; column 11; lines 10-30) of claim 1, wherein the substrate holder (5; Figure 1; column 11; lines 10-30) is a platform comprising a heated susceptor plate (structure 11-15; Figure 1; column 11; lines 10-30), as claimed by claim 14
- ii. The apparatus (Figure 1; column 11; lines 10-30) of claim 1, wherein the substrate holder (5; Figure 1; column 11; lines 10-30) holds the substrate (1; Figure 1; column 11; lines 10-30) in place by operation of the Bernoulli principle, as claimed by claim 15

Kobayashi teaches a heated Bernoulli chuck (Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Heming's substrate support (5; Figure 1; column 11; lines 10-30) with Kobayashi teaches a heated Bernoulli chuck.

Motivation to replace Heming's substrate support (5; Figure 1; column 11; lines 10-30) with Kobayashi teaches a heated Bernoulli chuck is for reducing dust contamination during processing as taught by Kobayashi (column 2, lines 55-63).

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15. Claims 17 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heming; Martin et al. (US 6025013 A) in view of Olgado; Donald J. K. et al. (US 6736408 B2).

Heming is discussed above. Heming does not teach:

- i. The apparatus (Figure 1; column 11; lines 10-30) of claim 16, wherein the substrate holder (5; Figure 1; column 11; lines 10-30) is a vacuum chuck, as claimed by claim 17
- ii. The apparatus (Figure 1; column 11; lines 10-30) in claim 1, wherein the gas outlet (16; Figure 1; column 11; lines 10-30) communicates with a venturi, as claimed by claim 19

Olgado teaches a wafer vacuum chuck (Figure 1) including a venturi (78; Figure 2) for process exhaust.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to replace Heming's substrate support (5; Figure 1; column 11; lines 10-30) with Olgado's vacuum chuck, and add Olgado's venturi for process exhaust.

Motivation to replace Heming's substrate support (5; Figure 1; column 11; lines 10-30) with Olgado's vacuum chuck, and add Olgado's venturi for process exhaust is for reducing particle contamination as taught by Olgado (column 1; line 66 – column 2, line 5).

Conclusion

16. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

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US 20040216665 A1

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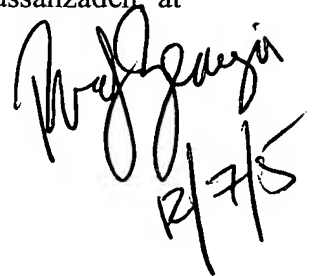
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17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272-1435.



Rudy Zervigon
12/7/15